SPEC CPU®2017 Integer Rate Result

Fujitsu
PRIMERGY TX2550 M7, Intel Xeon Gold 6448Y, 2.10GHz

SPECrate®2017_int_base = 582
SPECrate®2017_int_peak = Not Run

CPU2017 License: Fujitsu
Test Sponsor: Fujitsu
Tested by: Fujitsu

Hardware
CPU Name: Intel Xeon Gold 6448Y
Max MHz: 4100
Nominal: 2100
Enabled: 64 cores, 2 chips, 2 threads/core
Orderable: 1.2 chips
Cache L1: 32 KB I + 48 KB D on chip per core
L2: 2 MB I+D on chip per core
L3: 60 MB I+D on chip per chip
Other: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x SATA M.2 SSD, 480GB
Other: None

Software
OS: SUSE Linux Enterprise Server 15 SP4
5.14.21-150400.24.33-default
Compiler: C/C++, Version 2023.0 of Intel oneAPI DPC++/C++ Compiler for Linux;
Fortran: Version 2023.0 of Intel Fortran Compiler for Linux;
Parallel: No
Firmware: Fujitsu BIOS Version V1.0.0.0 R1.10.0 for D3985-A1x. Released Mar-2023
tested as V1.0.0.0 R0.30.2 for D3985-A1x Jan-2023
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage

Copies

<table>
<thead>
<tr>
<th>Specbench</th>
<th>Copies</th>
<th>SPECrate®2017_int_base (582)</th>
</tr>
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<tbody>
<tr>
<td>500.perlbench_r</td>
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<td>420</td>
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<td>502.mcf_r</td>
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<td>505.mcf_r</td>
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<td>520.omnetpp_r</td>
<td>128</td>
<td>385</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>128</td>
<td>1070</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>128</td>
<td>1200</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
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<td>411</td>
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<tr>
<td>541.leela_r</td>
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<tr>
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<td>128</td>
<td>1200</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>128</td>
<td>273</td>
</tr>
</tbody>
</table>
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
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<td>421</td>
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<td>505.mcf_r</td>
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<td>227</td>
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<td>520.omnetpp_r</td>
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<tr>
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<td>128</td>
<td>127</td>
<td>1070</td>
<td>126</td>
<td>1070</td>
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<td>525.x264_r</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>412</td>
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<td>411</td>
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<td>541.leela_r</td>
<td>128</td>
<td>542</td>
<td>391</td>
<td>541</td>
<td>392</td>
<td>541</td>
<td>392</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>128</td>
<td>278</td>
<td>1210</td>
<td>279</td>
<td>1200</td>
<td>279</td>
<td>1200</td>
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<tr>
<td>557.xz_r</td>
<td>128</td>
<td>506</td>
<td>273</td>
<td>506</td>
<td>273</td>
<td>506</td>
<td>273</td>
</tr>
</tbody>
</table>

Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk_r / 623.xalancbmk_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor.

For details, please see the config file.

Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"
cpupower -c all frequency-set -g performance

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu/lib/intel64:/home/Benchmark/speccpu/lib/ia32:/home/Benchmark/speccpu/je5.0.1-32"
MALLOC_CONF = "retain:true"
### General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Red Hat Enterprise Linux 8.4
Transparent Huge Pages enabled by default
Filesystem page cache synced and cleared with:
```
sync; echo 3> /proc/sys/vm/drop_caches
```
runcpu command invoked through numactl i.e.:
```
numactl --interleave=all runcpu <etc>
```
NR: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

### Platform Notes

BIOS configuration:
- DCU Streamer Prefetcher = Disabled
- Package C State limit = C0
- CPU Performance Boost = Aggressive
- SNC (Sub NUMA) = Enable SNC2
- PAN Control = Full

Sysinfo program `/home/Benchmark/speccpu/bin/sysinfo`
Rev: r6732 of 2022-11-07 fe91c89b7ed5c6ae2c92cc097bec197
running on localhost Fri Feb 17 21:24:29 2023

SUT (System Under Test) info as seen by some common utilities.

---

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---

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5. `sysinfo process ancestry`
6. `/proc/cpuinfo`
7. `lscpu`
8. `numactl --hardware`
9. `/proc/meminfo`
10. `who -r`
11. `Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)`
12. `Services, from systemctl list-unit-files`
13. `Linux kernel boot-time arguments, from /proc/cmdline`
14. `cpupower frequency-info`
15. `sysctl`
16. `/sys/kernel/mm/transparent_hugepage`
17. `/sys/kernel/mm/transparent_hugepage/khugepaged`
18. `OS release`
19. `Disk information`
20. `/sys/devices/virtual/dmi/id`
21. `dmidecode`
22. `BIOS`

---

(Continued on next page)
### Platform Notes (Continued)

2. `w`
   ```
   21:24:29 up 5 min,  2 users,  load average: 0.07, 1.26, 0.85
   USER     TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
   root     tty1     -                21:19   13.00s  1.99s  0.15s  -bash
   root     pts/0    10.41.49.27      21:20   37.00s  0.07s  0.07s  -bash
   ```

3. Username
   From environment variable `$USER`: root

4. `ulimit -a`
   ```
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority     (-e) 0
   file size               (blocks, -f) unlimited
   pending signals         (-i) 4125251
   max locked memory       (kbytes, -l) 64
   max memory size         (kbytes, -m) unlimited
   open files              (-n) 1024
   pipe size               (512 bytes, -p) 8
   POSIX message queues    (bytes, -q) 819200
   real-time priority      (-r) 0
   stack size              (kbytes, -s) unlimited
   cpu time                (seconds, -t) unlimited
   max user processes      (-u) 4125251
   virtual memory          (kbytes, -v) unlimited
   file locks              (-x) unlimited
   ```

5. `sysinfo process ancestry`
   ```
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   $SPEC = /home/Benchmark/speccpu
   ```

6. `/proc/cpuinfo`
   ```
   model name      : Intel(R) Xeon(R) Gold 6448Y
   vendor_id       : GenuineIntel
   cpu family      : 6
   model           : 143
   stepping        : 8
   microcode       : 0xb0000161
   bugs            : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores       : 32
   ```

(Continued on next page)
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SPECrate®2017_int_peak = Not Run

CPU2017 License: 19
Test Sponsor: Fujitsu
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Platform Notes (Continued)

siblings : 64
2 physical ids (chips)
128 processors (hardware threads)
physical id 0: core ids 0-31
physical id 1: core ids 0-31
physical id 0: apicids 0-63
physical id 1: apicids 128-191
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

------------------------------------------------------------
7. lscpu

From lscpu from util-linux 2.37.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 128
On-line CPU(s) list: 0-127
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 6448Y
CPU family: 6
Model: 143
Thread(s) per core: 2
Core(s) per socket: 32
Socket(s): 2
Stepping: 8
CPU max MHz: 4100.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
software Endianness: Little Endian
Virtualization: VT-x

L1d cache: 3 MiB (64 instances)
L1i cache: 2 MiB (64 instances)
L2 cache: 128 MiB (64 instances)
L3 cache: 120 MiB (2 instances)
NUMA node(s): 4
NUMA node0 CPU(s): 0-15,64-79
NUMA node1 CPU(s): 16-31,80-95
NUMA node2 CPU(s): 32-47,96-111
NUMA node3 CPU(s): 48-63,112-127
Vulnerability Itlb multihit: Not affected

(Continued on next page)
Platform Notes (Continued)

Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW sequence
Vulnerability Srbds: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>3M</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>2M</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>128M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L3</td>
<td>60M</td>
<td>120M</td>
<td>15</td>
<td>Unified</td>
<td>3</td>
<td>65536</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware

NOTE: a numactl 'node' might or might not correspond to a physical chip.

available: 4 nodes (0-3)
node 0 cpus: 0-15,64-79
node 0 size: 257620 MB
node 0 free: 256817 MB
node 1 cpus: 16-31,80-95
node 1 size: 258039 MB
node 1 free: 257392 MB
node 2 cpus: 32-47,96-111
node 2 size: 258005 MB
node 2 free: 257278 MB
node 3 cpus: 48-63,112-127
node 3 size: 257671 MB
node 3 free: 256978 MB
node distances:
node 0 1 2 3
0: 10 12 21 21
1: 12 10 21 21
2: 21 21 10 12
3: 21 21 12 10

9. /proc/meminfo

MemTotal: 1056089704 kB

10. who -r

run-level 3 Feb 17 21:19

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

Default Target Status
multi-user running

12. Services, from systemctl list-unit-files

STATE  FILES
UNIT FILES
YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ haveged irqbalance issue-generator kbdsettings kdump kdump-early klog lvm2-monitor nscd postfix

(Continued on next page)
**Platform Notes (Continued)**

- purge-kernels rollback rsyslog smartd sshd wicked wickeddd-auto4 wickeddd-dhcp4 wickeddd-dhcp6 wickeddd-nanny
- enabled-runtime systemd-remount-fs

13. Linux kernel boot-time arguments, from /proc/cmdline
   
   ```
   BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.24.33-default
   root=UUID=f9734f28-f8af-4b76-850e-33671a0d361c
   splash=silent
   mitigations=auto
   quiet
   security=apparmor
   crashkernel=321M,high
   crashkernel=72M,low
   ```

14. cpupower frequency-info

   ```
   analyzing CPU 0:
   current policy: frequency should be within 800 MHz and 4.10 GHz.
   The governor "powersave" may decide which speed to use within this range.
   ```

   ```
   boost state support:
   Supported: yes
   Active: yes
   ```

15. sysctl

   ```
   kernel.numa_balancing 1
   kernel.randomize_va_space 2
   vm.compaction_proactiveness 20
   vm.dirty_background_bytes 0
   vm.dirty_background_ratio 10
   vm.dirty_bytes 0
   vm.dirty_expire_centisecs 3000
   vm.dirty_ratio 20
   vm.dirty_writeback_centisecs 500
   vm.dirtytime_expire_seconds 43200
   vm.extfrag_threshold 500
   vm.min_unmapped_ratio 1
   vm.nr_hugepages 0
   vm.nr_hugepages_mempolicy 0
   vm.nr_overcommit_hugepages 0
   vm.swappiness 60
   vm.watermark_boost_factor 15000
   vm.watermark_scale_factor 10
   vm.zone_reclaim_mode 0
   ```

16. /sys/kernel/mm/transparent_hugepage

   ```
   defrag always defer defer+advise [madvises] never
   enabled [always] madvises never
   hpage_pmd_size 2097152
   shmem_enabled always within_size advise [never] deny force
   ```

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Platform Notes (Continued)

17. /sys/kernel/mm/transparent_hugepage/khugepaged
   alloc_sleep_millisecs 60000
   defrag 1
   max_ptes_none 511
   max_ptes_shared 256
   max_ptes_swap 64
   pages_to_scan 4096
   scan_sleep_millisecs 10000

18. OS release
   From /etc/*-release /etc/*-version
   os-release SUSE Linux Enterprise Server 15 SP4

19. Disk information
   SPEC is set to: /home/Benchmark/speccpu
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda2 xfs 445G 54G 392G 12% /

20. /sys/devices/virtual/dmi/id
   Vendor: FUJITSU
   Product: PRIMERGY TX2550 M7
   Product Family: SERVER
   Serial: EWCCxxxxxx

21. dmidecode
   Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
   Memory:
   16x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800

22. BIOS
   (This section combines info from /sys/devices and dmidecode.)
   BIOS Vendor: FUJITSU
   BIOS Version: V1.0.0.0 R0.30.2 for D3985-A1x
   BIOS Date: 01/24/2023
   BIOS Revision: 0.30
   Firmware Revision: 2.0

Compiler Version Notes

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base) 557.xz_r(base)

(Continued on next page)
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Test Sponsor: Fujitsu
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Test Date: Jan-2023
Hardware Availability: Mar-2023
Software Availability: Dec-2022

Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)
--------------------------------------------------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-lqkmalloc

(Continued on next page)
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Software Availability: Dec-2022

Base Optimization Flags (Continued)

C++ benchmarks:
-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-1/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-1qkmalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -xsapphirerapids -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-1/usr/local/intel/compiler/2023.0.0/linux/compiler/lib/intel64_lin
-1qkmalloc

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-SPR-RevA.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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Report generated on 2024-01-29 17:26:16 by CPU2017 PDF formatter v6716.
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